

REMARKS

Reconsideration and withdrawal of the rejection and the allowance of all claims now pending in the above-identified patent application (*i.e.*, Claims 5-9) are respectfully requested in view of the following remarks.

At the outset, Applicant's invention, as presently claimed, provides a method for the formation of glass flakes which allows for changing the particle thickness size distribution of the flakes of material being formed. More particularly, the glass flakes are formed by a process that includes the steps of feeding a stream of molten material in a downwards direction into a rotating cup or disc and allowing the material to pass over the edge of the cup or disc so that it is forced into a gap between a pair of plates surrounding the cup or disc. The movement of material in the process used for forming the flakes is maintained in an angular direction and effected by a flow of air passing through the plates and either side of the material, so as to pull the stream of material in a manner for keeping it flat and, further, to pull the stream of material so that, as solidification of the material is effected, the sheet of material so formed is broken into flakes.

In sharp contrast to the prior art, and as will be explained in greater detail, the presently claimed method includes the step of varying the distance between the cup, or the disc, and the entrance to the gap between the plates until the desired particle thickness size distribution of the flakes is obtained. Although it was previously known that variation of the distance between the cup and the plates was one of many factors which could affect flake size (as explained in Applicant's *Specification* at Page 4), it was not recog-

nized that varying this distance could have a profound effect on particle thickness size distribution, and it is this particular characteristic of a product that is fundamental to the quality thereof. Prior to the development of the present invention, it had been assumed that any significant increase of the cup-plate separation, beyond the median at which an acceptable product is obtained, would lead to a deterioration of the product and, in particular, its flatness and any such reduction simply reduced the nominal flake diameter. It was therefore surprising for the inventor to discover that the cup-plate separation can be substantially increased or decreased with a concomitant change in particle size distribution without any other reduction in the quality of the product, provided the nominal thickness difference is compensated for by one of the remaining parameters.

As will be explained in greater detail hereinafter, nowhere in the prior art is such a novel and efficient method for varying the particle size distribution of a flake product, such as glass flakes, which includes the step of varying the distance between the cup, or the disc, and the entrance to the gap between the pair of plates, until the desired particle thickness distribution of the flakes is obtained, either disclosed or suggested.

Turning now, in detail, to an analysis of the Examiner's prior art rejections, initially, in the first Office Action the Examiner has rejected pending Claims 5-9 as being obvious, pursuant to 35 U.S.C. §103(a), over Watkinson *et al.*, U.S. Patent No. 5,017,207, on the contention that Watkinson *et al.* discloses a method for changing the size and thickness of glass flakes produced by a method, which includes the steps of feeding molten glass in a downward direction to a rotating cup and allowing the stream to

flow over the edge of the cup and into a gap and in an angular direction via air flow between two plates. The Examiner has contended that the thickness of the flakes produced can be changed by the step of adjusting the flow of glass into the rotating cup, the speed of rotation of the cup, the distance between the annular extraction plates, as well as other parameters of the process. The Examiner has, however, conceded that Watkinson *et al.* does not explicitly disclose adjusting the distance between the rotating cup and an entrance to the gap between the pair of plates for achieving the desired thickness. Instead, the Examiner's stated position is that Watkinson *et al.* discloses varying "many parameters," as discussed above, and, hence, it would have been obvious to try varying the distance between the cup and the entrance gap in an attempt to vary the distance the material flows after leaving the rotating cut for achieving a desired particle thickness distribution of glass flakes.

Separately, the Examiner has rejected independent Claim 5 (inadvertently written as "Claim 1" in the first Office Action) as being obvious, over Claim 9 of Watkinson *et al.*, U.S. Patent No. 5,017,207, taken in view of Watkinson *et al.*, P.C.T. Application Publication No. WO 88/08412, pursuant to the non-statutory doctrine of obviousness-type double patenting. As part of this obviousness rejection, the Examiner has again acknowledged that Watkinson *et al.* '207 fails to teach "varying a distance between the cup, or the disc, and an entrance to the gap between the pair of plates to obtain a desired particle thickness." The Examiner has secondarily-applied Watkinson *et al.* '412 for seeking to establish that it would be readily apparent to the skilled artisan as to how various parameters may be varied for producing glass flakes of a required size and thick-

ness, thereby rendering Applicant's pending independent claim as obvious over Claim 9 of *Watkinson et al.* '207.

Procedurally addressing the Examiner's obviousness-type double patenting rejection of independent Claim 5, both *Watkinson et al.* '207 and *Watkinson et al.* '412 are "statutory" prior art under 35 U.S.C. §102(b) and, as such, issuance of an obviousness rejection under the non-statutory doctrine of obviousness-type double patenting would appear to be inappropriate. Consequently, the entirety of the disclosures of each of the applied references, as opposed to simply the claims of the issued United States patent, are properly citable as "prior" art. Further, *Watkinson et al.*, U.S. Patent No. 5,017,207, represents the U.S. National Phase, pursuant to 35 U.S.C. §371, of *Watkinson et al.*, P.C.T. Application Publication No. WO 88/08412, and, consequently, both the applied U.S. patent reference and the related published P.C.T. international application are one and the same and necessarily have the same disclosures. Accordingly, because both *Watkinson et al.* '207 and *Watkinson et al.* '412 have identical disclosures and are fully citable for all which they disclose and suggest, it is respectfully submitted that the obviousness-type double patenting rejection of independent Claim 5 is the legal equivalent of the statutory obviousness rejection, issued under 35 U.S.C. §103(a), which applies solely *Watkinson et al.* '207 against pending Claims 5-9. If Claims 5-9 are patentably distinct over *Watkinson et al.* '207, it necessarily follows that independent Claim 5 must be patentably over the combination of the "two" identical references.

In reply to the Examiner's obviousness rejection of Claims 5-9 applying *Watkin-*

son *et al.* '207, Applicant respectfully states that, for many applications of glass flakes, it is important that the flakes have as narrow a thickness range as possible. The method and related apparatus for forming glass flakes that is explained in the applied citation of Watkinson *et al.* was developed in the mid-1980's, a time when it was appreciated that various parameters of the method and apparatus utilized therewith could be altered to affect the glass flake material being produced, and the Examiner has pointed this out in the issued obviousness rejection. The variables exemplified by the prior art include the volume of the molten stream entering the rotating cup, the temperature of the material, the speed of the centrifuge cup, the diameter of the centrifuge cup, the gap between the pair of plates, the distance between the cup and the exit from the pair of plates and the airflow out of the chamber. (*See*, Watkinson *et al.* at Col. 2, lines 7-46)

It should, however, be noted, as the Examiner would appear to agree, that there is no disclosure or suggestion in Watkinson *et al.* of varying the distance between the rotating cup and the entrance to the gap between the pair of plates. Likewise, the applied reference fails to teach or suggest anything relating to the distribution of particle thickness to the extent to which the thickness of the particles may vary, rather than their average thickness or the size of the glass flakes produced. To the extent that "thickness" is discussed by the prior art, it is in connection with "size" and is clearly as a reference to average thickness or average size, for which only three parameters are suggested. (*See*, Watkinson *et al.* at Col. 2, lines 7-10: "By suitable choice of speed of rotation of the cup, the distance between the two plates and choice of air flow through the vacuum chamber, the size and thickness of the flakes of material to be produced can be controlled.")

Accordingly, Watkinson *et al.* not only does not mention the parameter which is of critical importance to the present invention, but also fails to discuss the use of any parameters – or the variation thereof – to effect thickness distribution, rather than average size or average thickness. Indeed, the apparatus described by the applied Watkinson *et al.* reference was operated by Applicant for many years before the discovery was made that a selected, new parameter, *i.e.*, the distance between the cup and the entrance to the pair of plates, can be varied for controlling the thickness distribution of the glass flakes produced. The discovery, made at least fifteen years after the invention of the basic apparatus, and over a period during which considerable experimentation was undertaken, was, and is, regarded as a breakthrough in the achievement of a method able to produce a relatively narrow thickness distribution.

Finally, accompanying this *Response* is a diagram, similar to that of FIG. 1 of Applicant's *Specification*, but illustrating, perhaps more clearly, just how effective varying the distance between the rotating cup and the entrance to the plates (referred to as "Venturi" in the diagram) is in controlling the thickness distribution of the glass flakes produced. More particularly, in the example shown in the diagram, reducing the distance from 500 units via 200 units, to 100 units, it is possible to narrow the distribution of 60% of flake thickness from 327 Mn via 263 Mn, to 110 Mn. The effect, as exemplified by the attached diagram, is respectfully submitted to be unexpected – unpredictable – and in no manner suggested by the applied Watkinson *et al.* patent reference.

It is, therefore, respectfully submitted that Applicant's invention, as most broadly

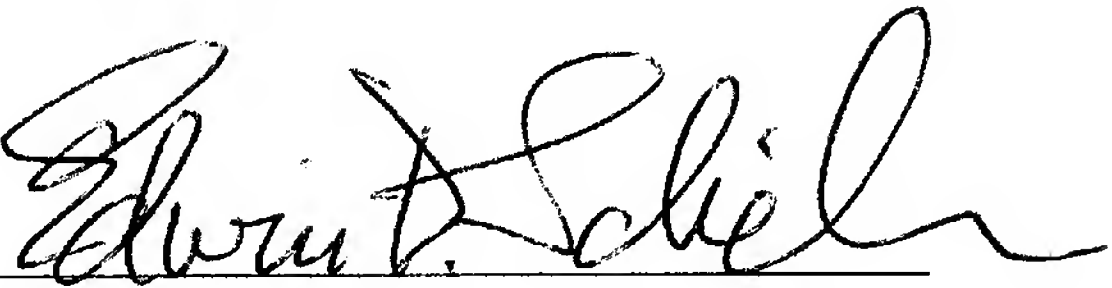
recited in independent Claim 5, as currently of record, cannot reasonably be viewed as being obvious over Watkinson *et al.*, U.S. Patent No. 5,017,207, and it is therefore requested that the Examiner's 35 U.S.C. §103(a) obviousness rejection of the first Office Action should be appropriately withdrawn.

In light of the foregoing, it is respectfully contended that all claims now pending in the above-identified patent application (*i.e.*, Claims 5-9) recite a novel and efficient method for varying the particle size distribution of a flake product, such as glass flakes, which includes the step of varying the distance between the cup, or the disc, and the entrance to the gap between the pair of plates, until the desired particle thickness distribution of the flakes is obtained, which is patentably distinguishable over the prior

art. Accordingly, withdrawal of the outstanding rejection and the allowance of all claims now pending are respectfully requested and earnestly solicited.

Respectfully submitted,

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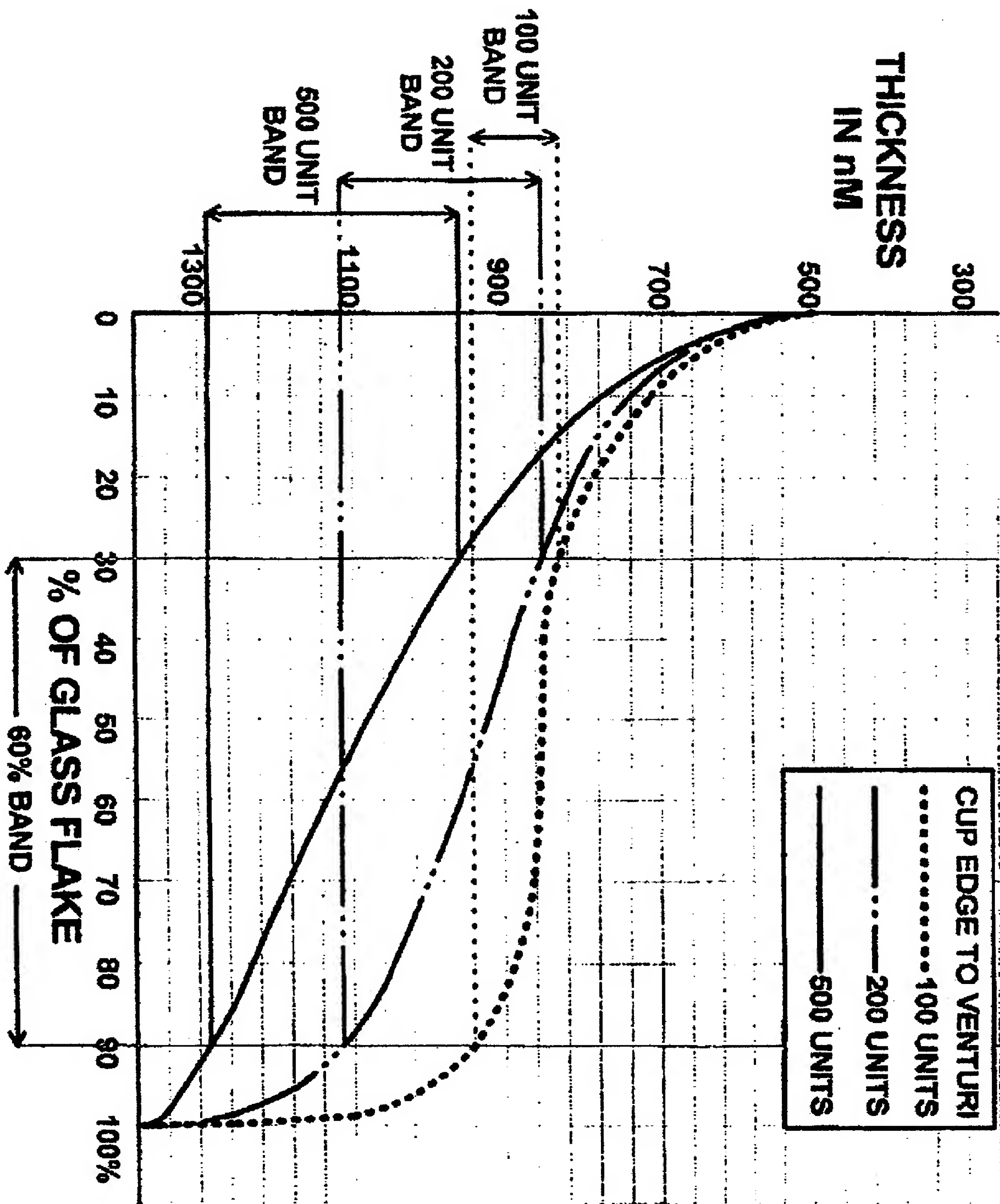
(631)474-5373

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Enc.: 1. Petition for Three-Month Extension of Time for Response; and,
2. EFT for \$555.00 (Three-Month Extension Fee).

The Commissioner for Patents is hereby authorized to charge the Deposit Account of Applicant's Attorney (*Account No. 19-0450*) for any fees or costs pertaining to the prosecution of the above-identified patent application, but which have not otherwise been provided for.

A MEANS OF EFFECTING PARTICLE SIZE DISTRIBUTION IN GLASS FLAKE PRODUCTION



60% Band @ 100 units, thickness distribution 830nm - 940nm, distribution width 110nm.
 60% Band @ 200 units, thickness distribution 852nm - 1115nm, distribution width 263nm.
 60% Band @ 500 units, thickness distribution 958nm - 1285nm, distribution width 327nm.